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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

HU, SHOUXIANG

ART UNIT PAPER NUMBER

2811

DATE MAILED: 04/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/940,575

Applicant(s)

DEN, TOHRU

Examiner

Shouxiang Hu

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 January 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 9 and 12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10, 11 and 13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 9 and 12 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 8.

Drawings

2. Figure 6 is objected to as it should be designated by a legend such as –Prior Art- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claims 1-8, 10, 11 and 13 are objected to because of the following informalities and/or defects:

Claim 1, along with claims 2-8, 10, 11, and 13, recites the terms of “pores”, “a part of the pores” and “writing wires for writing into the magnetic layers”; but, in view of the instant disclosure, it fails to clearly and definitely define the subject matters of the instant invention: (1) each of the pores is a cut-through one, extending to both faces of the layer that contains the pores; (2) the part of the pores filled with the layered column

and the part of the pores filled with the conductive column are different pores, thus they should be distinguished by reciting them respectively as a first and second groups of the pores; and (3) the writing wires are for writing magnetization configurations into the magnetic layers.

In addition, claim 1 recites the limitation "the adjacent pores". There is insufficient antecedent basis for this limitation in the claim.

In claim 2, the term of "nano-holes of alumina" fails to clearly reflect the subject matter of the instant invention that the nano-holes are formed in (instead of "of") the alumina layer.

In claims 3 and 4, the term of "a part of the pores serve to intercept a magnetic field" fails to clearly define the subject matter of the instant invention that the filling magnetic material in the third group of pores, not the pores themselves, serves to intercept the magnetic field.

In claim 4, the word "surround" should read as --surrounding--.

In claim 11, the term of "the pore serving as the writing wire" lacks a sufficient antecedent basis for it in the claim.

In claims 11 and 13, the term of "the pore" should read as: --each of the pores--.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2811

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-8, 10, 11 and 13, as being best understood in view of the claim objections above, are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki et al. ("Iwasaki"; JP 2000-31462; 01/28/2000; also see US 6,278,231, of record, for its English translation) in view of Prinz (US 5,541,868).

Iwasaki discloses a magnetic device (see Figs. 16 and col. 23, lines 15-51, in US 6,278,231), comprising: a membrane layer (13; alumina) having cut-through fine pores; wirings on both faces of the membrane layer; and a substrate (82), wherein, since each of the pores is filled with a Co-Cu GMR layered column which is inherently conductive, the fine pores in Fig. 16 of Iwasaki inherently includes a first group of pores filled with a layered column formed of stacking Co/Cu layers, and a second group of pores filled with a conductive column adjacent to the first group of pores.

Iwasaki does not expressly disclose that the conductive column in the second group of pores can be used as a writing wire for writing magnetization configurations into the magnetic layers in the nearby first group of pores. However, one of ordinary skill in the art would readily recognize that magnetization configurations in magnetic layers nearby a conductive column can be readily written with reduced adverse cross-talk by passing a writing current through the conductive column, as evidenced in Prinz (see Figs. 9 and 10, and col. 2, lines 33-37). In Figs. 9 and 10, Prinz teaches to form a magnetic device by forming a conductive column (912) in a pore as a writing wire for writing magnetization configurations into the nearby magnetic layer (909).

Therefore, it would have been obvious for one of ordinary skill in the art at the time of the invention to make the magnetic device of Iwasaki with at least one of the conductive columns being used as a writing wire for writing magnetization configurations into the adjacent magnetic layers in the surrounding pores, as taught in Prinz, so that a magnetic layer with reduced adverse cross-talk would be obtained.

Regarding claims 3 and 4, it is noted that the pores that are adjacent to the above first and second group of pores can be regarded as a third group of pores in which the magnetic layers can inherently function to intercept a magnetic field surrounding a unit cell, since at least some of the magnetic layers in a GMR element normally have a relatively lower coercivity and thus can function as a magnetic shielding material.

Regarding claim 7, the pores in Iwasaki are naturally arranged in a honeycomb arrangement (see Fig. 21C).

Regarding claims 10 and 11, it is noted that one of ordinary skill in the art would readily recognize that the individual GMR elements (or the layered columns) can also be arranged in a rectangular array with a square arrangement, as the writing magnetic field generated from the central writing wire (as the one in Prinz) still has a same writing strength for the square-arranged adjacent GMR elements.

Regarding claim 13, the diameter of the pore in Iwasaki can be a value such as 160nm (see col. 1, lines 51-59) and the thickness of the alumina layer therein can be about 500nm (see col. 20, lines 64-65, and col. 27, lines 16), which would inherently result in an L/S ratio of about 2.5×10^5 .

Conclusion


The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Reference B is cited as being related to a magnetic device with GMR elements formed in nano-pores.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is (703) 306-5729. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SH
March 21, 2003


Shouxiang Hu
Patent Examiner
TC2800